TEXTILE TECHNOLOGY DIGEST

VOLUME 11 OCTOBER, 1954 NUMBER 10

ABSTRACTS

FIBERS A

NATURAL FIBERS A 1

Progress report on the annual varietal and environmental study of fiber and spinning properties of cottons: 1953 crop

Beltsville, Md., U. S. Agricultural Research Service, June 1954. 105p.

In this year's report, in addition to describing the testing procedure, new fiber and spinning tests and techniques are discussed with special reference to the following fields of application: variety improvement, cotton processing, and cotton technology.

Cotton counts its customers

Memphis, Tenn., National Cotton Council of America, Utilization Research Division, 1954. 32p.

The quantity of cotton consumed in final uses in the United States: revised 1952 and preliminary 1953. The purpose of this study, and others in the series, is to provide the cotton industry and allied interest groups with a gauge for measuring significant changes in the quantity of cotton and other materials consumed in principal uses.

Cotton varieties planted, 1950-1954

Memphis, Tenn., U. S. Agricultural Marketing Service, August 1954. 27p.

This is the fourth in the series of annual reports entitled *Cotton Varieties Planted,* published by the Department of Agriculture. The report presents estimates of the percentage of the various varieties of cotton planted in the United States in 1954, by counties, districts, and states. Comparative data for the four years 1950-53 are shown by districts and by states.

The effect of weathering prior to harvest on certain properties of cotton fiber

P. B. Marsh, G. V. Merola, K. Bollinbacher, M. L. Butler and M. Simpson (U. S. Dept. Agr., Beltsville, Md.). *Plant Disease Reptr. 38, No. 2:* 106-119 (1954). Through *Chem. Abstracts 48:* 9696 (August 25, 1954).

A review with new data. "Microbial tightlock" and the effect of weathering on normally fluffed bolls are discussed. Weathering can be detected by determining changes in the pH of the aqueous extract, content of reducing substances, degree of swelling in alkali, absorption of Chlorantine Fast Green, moisture regain, and length, strength, and appearance under ultraviolet light of the fibers. 17 references.

Technological reports on trade varieties of Indian cottons, 1953

C. Nanjundayya. *Indian Central Cotton Committee. Technological Bull. Series A, No. 84:* 1-79 (December, 1953).

Technological reports on standard Indian cottons, 1953

C. Nanjundayya. *Indian Central Cotton Committee. Technological Bull. Series A, No. 85:* 1-98 (December, 1953).

Concentric cellulose layers in cotton fiber cell wall

V. W. Tripp and R. Giuffria (Southern Regional Research Laboratory). *(Letter to the Editor). Textile Research J. 24:* 757-758 (August, 1954).

Chemical build-up for King Cotton

Chem. Week 75: 97-98 (August 21, 1954).

The present state and possible future of cyanoethylated cotton, developed by the Institute of Textile Technology. Pilot plants are under construction by American Cyanamid and Monsanto for field evaluation of cyanoethylated fabric.

Directional triboelectric effects of wool and hair

S. P. Hersh and D. J. Montgomery (Textile Research Institute). *(Letter to the Editor). Textile Research J. 24:* 755-756 (August, 1954).

Nature of the hemicelluloses of jute fiber. Part 2

P. C. Das Gupta and P. B. Sarkar (Indian Central Jute Committee). *Textile Research J. 24:* 705-711 (August, 1954).

Hemicellulose I and methylaldobiuronic acid isolated therefrom were subjected to oxidation with periodate, and the consumption of periodate at different lengths of time, temperatures, pH's, etc., was measured in order to determine optimum conditions and the amounts of formic acid and formaldehyde liberated during the oxidation. The

molecular weight of hemicellulose I, as its sodium salt, was determined by the osmotic-pressure method. Its behavior towards alkaline 3:5-dinitrosalicylic acid was also studied. 22 references.

Predicting the spinning qualities of olitorius jute

S. B. Bandyopadhyay, U. Chatterjee and S. K. Mukhopadhyay (Indian Central Jute Committee). *Fibres 15:* 295-298 (September, 1954).

This paper describes work on the prediction of jute yarn quality from the measurement of nine fiber characters. Correlation analyses have been made and prediction equations involving ballistic work of rupture of twisted fiber bundles and reed length have been recommended. In contrast with *capsularis* variety, it has been found here that fiber rigidity contributes very little, and fiber ballistic work of rupture somewhat more, in explaining the yarn quality ratio variation. 14 references.

Some observations on the rigidity of jute, ramie, and sisal

K. R. Sen and S. K. Bose (Indian Central Jute Committee). *(Letter to the Editor). Textile Research J. 24:* 754-755 (August, 1954).

New knowledge about the chemistry of silk

H. Zahn and H. Zuber. *Textil-Rundschau 9:* 119-125 (March, 1954).

English summary in *Brit. Rayon and Silk J. 30:* 69-70 (May, 1954), and in *Dyer 112:* 123 (July 23, 1954).

The future of the natural fibers

A. J. Turner. *J. Textile Inst. 45:* P317-P327 (July, 1954).

The author discusses the fundamental requirements in any textile fiber and how far the natural fibers of commerce meet these requirements and arrives at an optimistic conclusion about the future of the natural fibers. The economic future of the natural fibers is included in the discussion.

MAN-MADE FIBERS A 2

Rayon in modern blankets

R. A. Smith. *Modern Textiles Mag. 35:* 32-33, 52-54 (August, 1954).

The characteristics of the ideal blanket fiber and blanket are discussed, together with how well rayon fills these requirements.

Man-made fiber data sheets. Part 5. Peanut protein fiber: Ardil

P. A. Koch. *Modern Textiles Mag. 35:* 46-50 (August, 1954); *Fibres 15:* 313-315 (September, 1954).

Comprehensive survey of manufacture, properties, composition, uses, etc., of Ardil. 54 references.

Crossbonding of casein bristle fiber

R. F. Peterson, R. L. McDowell and B. J. Harrington. *Textile Research J. 24:* 747-753 (August, 1954).

A method is described for reducing the rate of water uptake of casein fibers and plastics. The method involves treating formaldehyde-hardened casein products with resorcinol and formaldehyde, drying, and heating. Optimum conditions for this treatment are described. The results indicate that resorcinol forms crossbonds with casein and formaldehyde. 17 references.

Milk casein and peanut protein fibers

R. L. Wormell. *J. Textile Inst. 44:* P258-P271 (July, 1953).

Development of man-made protein fibers is traced and the production of casein and peanut protein fibers is described. The properties of Courtauld's protein fibers are pointed out. Discussion.

Filament surface investigation by a simple interferometric method with particular reference to nylon filaments

S. C. Simmens (British Nylon Spinners Ltd). *(Letter to the Editor). J. Textile Inst. 45:* T569-T574 (July, 1954).

Influence of heat and of swelling agents on 66 nylon yarns. Part 1. General experiments on length equilibria

M. V. Forward and H. J. Palmer (British Nylon Spinners Ltd.). *J. Textile Inst. 45:* T510-T538 (July, 1954).

One of the commercially important properties of 66 nylon is that it can be set, i.e. a fabric can be treated, by heating either alone or with a swelling agent, so that the configurations of its constituent yarns remain stable during normal use and laundering. The actions of heat and swelling agents on nylon are, therefore, of practical importance, and they are also of theoretical interest in the investigation of the fine physical structure of 66 nylon. This series of papers is intended to describe a continuing laboratory investigation of the mechanisms of swelling and of setting 66 nylon yarns. It is emphasized that the results apply strictly only to the particular 66 nylon yarns and monofilaments used. While the results apply qualitatively for other 66 nylon yarns, there may be quantitative differences. Part 1 deals

with the changes in length, at equilibrium, of drawn and undrawn 66 nylon yarns on heating and on immersion in swelling agents. Both treatments produce reversible and irreversible changes. 22 references.

Influence of heat and of swelling agents on 66 nylon yarns. Part 2. Changes in length with time in aqueous swelling media

H. J. Palmer. *J. Textile Inst. 45:* T539-T558 (July, 1954).

Part 2 describes measurement of the changes in length with time of 66 nylon yarns in water and in aqueous phenol. Two types of experiments were made (a) immersion of relaxed yarns (b) re-immersion of the same yarns after they had been phenol-treated, washed and conditioned. In the first case, both reversible swelling and irreversible changes in the configuration of polymer chain molecules occurred. On re-immersion, only the reversible swelling took place. 11 references.

Influence of heat and of swelling agents on 66 nylon yarns. Part 3. Changes in length at equilibrium in dilute non-aqueous phenol solutions

M. V. Forward. *J. Textile Inst. 45:* T559-T568 (July, 1954).

Part 3 describes measurement of the changes in length of drawn and undrawn nylon yarns caused by various organic liquids and by 1 per cent solutions of phenol in the organic liquids. Three types of swelling behavior could be distinguished and organic solvents could be classified on that basis. 6 references.

Teflon

E. I. du Pont de Nemours & Co. *Textile World 104:* 65 (September, 1954).

Important properties of Teflon are strength and resistance to chemicals and high temperatures. Its main fabric uses are filtration, laundry, belting, and tapes.

Industrial uses of Terylene polyester fiber

Fibres 15: 310-311 (September, 1954).

An outline of the properties of this fiber and its role in industry.

Tensile recovery of Vinylon

N. Mori and T. Tanaka. *J. Soc. Textile Cellulose Ind. Japan, 10, No. 3:* 93-96 (1954); *in Japanese (English summary).* Through *Brit. Cotton Ind. Research Assoc. 34:* 500 (July 15, 1954).

The tensile recovery of Vinylon, measured under variable conditions of spinning, heat treatment and formalization, was found to be affected by 60 per cent stretching at 180°C, and heat treatment and formalization under tension. The elastic recovery, which under these conditions is almost 70 per cent (5 per cent elongation) is much higher than that of ordinary Vinylon. When the fiber is allowed to relax in boiling water, it shrinks, and the elastic recovered decreases.

GENERAL A 3

Mechanical behavior of fibers. Part 1. The visco-elastic properties of isotropic cellulose filament in water. Part 2. Creep of isotropic cellulose filament in water

N. Oguchi. *J. Soc. Textile Cellulose Ind. Japan, 10, No. 3:* 120-124, 124-127 (1954); *in Japanese (English summary).*

The recovery of stress in fiber. Part 1. The measurement of the stress recovery

G. Osawa. *J. Soc. Textile Cellulose Ind. Japan, 10, No. 3:* 116-120 (1954); *in Japanese (English summary).*

The particle properties of the crystalline regions of the cellulose fiber

W. Kast. *Z. Elektrochem. 57:* 525-530 (1953). Summary in *Chem. Abstracts 48, No. 7:* 4217 (1954).

Swelling of hair and a viscose rayon monofil in aqueous solutions

W. S. Barnard and H. J. White, Jr. (Textile Research Institute). *Textile Research J. 24:* 695-704 (August, 1954).

Equipment for measuring the swelling of nearly round single fibers in a variety of solutions is described and has been used to make measurements on the swelling of human hair and a viscose rayon monofil. In particular, measurements have been made on the swelling of both types of fiber in various alkali halide solutions and of the hair in HCl solutions. Except for NaCl solutions, the solutions used in this work caused swelling beyond that caused by liquid water, indicating that the solutes were absorbed by the fibers. The swelling changes in hair caused by altering the different variables common in an acid dye bath for wool have also been studied. 21 references.

Torsional rigidity of textile fibers

R. Meredith (British Cotton Ind. Research Assoc.). *J. Textile Inst. 45:* T489-T503 (July, 1954).

This paper is concerned with the initial resistance to twisting of single fibers from 34 samples of natural and man-made fibers. The torsion pendulum method of measurement is used with a period of oscillation from 4 to 9

seconds and twist less than half-a-turn per centimeter. The estimation of shape factors, i.e. the ratio of the torsional rigidity of a fiber of a given cross-sectional shape to that of a similar fiber of circular cross-section, is dealt with in an appendix. 20 references.

YARNS B

OPENING AND PICKING B 1

Aerodynamic phenomena during fiber transport in the opener

A. Gutt. *Prace Inst. Wlok. 3, No. 2:* 11-22 (1953); *in Polish.* Through *Brit. Cotton Ind. Research Assoc. 34:* 629 (August 31, 1954).

The study was carried out on a pneumatic Platt opener in order to investigate (1) the pressure distribution and air-flow velocity in the space between the beater and the drum sieves; (2) the degree of pressure and air-flow velocity in dependence of the type of beaters and of the number of revolutions; (3) the action of three types of beaters (three-blade, knife, and porcupine), assuming that they act as fans; (4) the co-operation between beater and fan (as a two-fan system in one installation); (5) the relationship between the number of revolutions of beater and fan at a suitable air velocity. Results show the necessity of introducing some constructional changes in the beating chamber of the opener examined.

Combating atmospheric dryness

Indian Textile J. 64: 241 (January, 1954). Through *Brit. Cotton Ind. Research Assoc. 34:* 501 (July 15, 1954).

Methyl bornoxy oil is a compound of sulfonated fatty glycerides and higher alcohols, fenchyl and borneol derivatives, with other chemicals. It is dissolved in water and sprayed on to cotton whereby it provides protection from the injurious effects of dry and warm atmospheric conditions. This note presents the results of some tests on the effect of methyl bornoxy oil on the quality of yarns spun from Indian cotton. The results show that the use of this oil results in a reduction of about 20 per cent in end breaks, both at the spinning and winding frames, as compared with the untreated products.

Cotton opening machinery: SRRL super cotton opener

Textile Wkly. 54: 492-498 (August 13, 1954).

A discussion of the history and uses of the SRRL opener developed by the Southern Regional Research Laboratory.

New Whitin opening, cleaning machinery

Can. Textile J. 71: 58-61 (September 10, 1954).

The Whitin Axi-feed and Axi-flo are described and illustrated.

Shirley opener

Globe Rev. 1, No. 1: 9-16 (1954).

Tables of test data and photographs are presented from recent processing tests on the Shirley opener.

Picker laps

P. M. Thomas. *Textile World 104:* 76-78 (August, 1954).

An inch-by-inch-variation tester for picker laps helped Borden Mills cut its maximum lap variation a third and its coefficient of variation a quarter. Repeat patterns indicate the picker parts causing variation.

CARDING AND COMBING B 2

Card-clothing care

Textile World 104: 76-77, 277, 280 (September, 1954).

Card-clothing care can be broken down into four categories: storage of clothing, preparation of the card, application, and care after application. Each of these categories is discussed.

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Cotton combing

Textile Wkly. 54: 412-417 (August 6, 1954); 641-644 (August 27, 1954).

A survey of the theory and practice of the combing process.

Effect of lap preparation on waste extraction at the cotton comber

W. E. Morton and R. Nield. *J. Textile Inst. 44:* T317-T334 (July, 1953).

By changing the preparation of the lap before combing, a higher percentage of short fibers was removed as waste and not as much waste was produced. Stronger and more uniform yarns were made. Disadvantages of the preparation were that a drawing operation was introduced between the card and the sliver lapper and the direction of sliver flow had to be reversed. Experimental procedures used are described. Considerable data are given. The influence of hooked fibers on these results is discussed. 5 references.

Improvements for combers

Saco-Lowell Bull. 26: 22-27 (July, 1954).

Three improvements for the Saco-Lowell comber are described and illustrated: (1) the 4 over 5 draw box, (2) the 14 inch or 15 inch coiler, and (3) the split lap preventer.

New coiler

Saco-Lowell Bull. 26: 34-42 (July, 1954).

New Saco-Lowell coilers for cards and combers are described in detail. Photographs and diagrams.

New technique in combing

Platts Bull. 8, No. 7: 195-208 (1954).

The new Platt technique is in three sections: (1) improved lap preparation for combing, (2) the two-line drafting system at the comber draw-box, (3) the two-line drafting system on the drawing frames subsequent to the comber. The improved method of lap preparation offers a marked increase in comber production, a reduction in the waste percentage and more effective fractionation. Employment of the two-line drafting system at the comber draw-box can reduce the irregularity of the combed sliver by approximately 30% to 40%. The advantages of two-line drafting at the comber can be extended to drawing after combing, and the adoption of this system at these subsequent machines still further improves the sliver regularity. Tables, graphs, photographs.

Saco-Lowell combing cycle

Saco-Lowell Bull. 26: 14-21 (July, 1954).

Seven basic phases of the combing cycle are discussed and the complete cycle is illustrated in six diagrams. A comber timing chart is also presented.

DRAWING AND ROVING B 3

Back draft and subsequent untwisting during drafting

B. Gangli. *Magyar Textiltech. No. 1: 5-8; No. 2:* 36-40 (1953); *in Hungarian.* Through *Brit. Cotton Ind. Research Assoc. 34:* 631 (August 31, 1954).

At an optimum back draft of between 1·18 and 1·21, (1) the fibers are completely stretched; (2) owing to stretching the twist runs up the fibers and exerts a regulating effect on the fiber motion; (3) the compensating effect of the twist is similar to that of the self-acting mule. The setting of the top rollers 1 and 2 has no decisive bearing on the variations in count, but the gripping capacity of the first pair of rollers is of great importance and depends upon the covering of the top roller. If this covering is sufficiently elastic, the roving sinks into it and the top roller will then be driven by the fluted roller instead of the roving. A minimum pressure of 0.6 kg per cm must be applied to the rollers; a higher pressure has no additional effect on the results.

Drafting system

R. Lavendier. *Industrie Textile:* 181-182 (March, 1954); *in French.* Through *Brit. Cotton Ind. Research Assoc. 34:* 585 (August 14, 1954).

A new process is described which consists in drawing the card sliver in three successive drawing phases, in each of which the degree of draft applied is appreciably higher than that which would be necessary for reducing the combined slivers, entering each drawing head, to a single sliver having the same weight per unit length. In each of the consecutive phases (second and third), the degree of draft is progressively increased in proportion to that effected in the preceding phase.

Effect of the type and adjustment of drawing rollers on the drafting and gripping forces

K. Quaas. *Textil-Praxis 9:* 324-329 (April, 1954); *in German.* Through *Brit. Cotton Ind. Research Assoc. 34:* 502 (July 15, 1954).

The drafting forces in main and preliminary drafting zones were determined in draw frames with varying draft, size of drafting zone, and type of aprons, and it was found that a certain regular relationship exists between the magnitude of draft and the drafting force produced. Attempt is made to explain the deviation of this relationship from the linear function. One series of experiments served to elucidate, respectively, the gripping power and slippage of the roller-pair

at various loads. By using a photocell it was found that absolute gripping can be effected only with very high loads; with the generally used roller weights, the difference is almost negligible. The determinations were carried out with an apparatus which makes it possible to measure electrically the forces activated during drafting at the front roller-pair.

Fiber motion in the roller draft field. Part 1

S. Ichino and H. Goto. *J. Soc. Textile Cellulose Ind. Japan, 10, No. 3:* 101-111 (1954); *in Japanese (English summary).* Through *Brit. Cotton Ind. Research Assoc. 34:* 503 (July 15, 1954).

Relation between the fiber motion and the arrangement in the roller draft field is discussed. The results obtained are reviewed under the following headings: the classification of assumptions; the relation between the sliver diagram and the continuity equation on the classification of steady and unsteady motions.

Irregularity of the draw-frame sliver and its equalization

P. I. Aristov. *Tekstil. Prom. 14, No. 4:* 18-22 (1954); *in Russian.* Through *Brit. Cotton Ind. Research Assoc. 34:* 631 (August 31, 1954).

The causes of sliver irregularity are investigated, with special reference to that appearing after drawing over the whole width or a considerable portion of the sliver. The kinetics of sliver formation are discussed and the possibility of eliminating the irregularity is shown on the basis of mathematical analysis of the sliver formation process. Reference is made to the draw frame LVC 305, in which the problem of the passage and packing of two slivers into one sliver can of normal size is successfully solved by shifting the condenser trumpet towards the center of the drawing passage.

Weighting of draw-frame rollers

R. Locker. *Z. ges. Textil-Ind. 56, No. 8:* 410-416 (1954); *in German.* Through *Brit. Cotton Ind. Research Assoc. 34:* 542 (July 31, 1954).

The tendency to replace the weights on the upper rollers of draw-frames by spring-weighted systems has led to the development of the pendulum arm PK 211, whose construction, mechanism, and application in double-apron draw-frames are described.

Properties of apparel wools. Part 6. Aging of top and roving produced on the French worsted system

H. M. Burte (Textile Research Institute). *Textile Research J. 24:* 716-726 (August, 1954).

The aging of top and roving produced on the French worsted system has been investigated by measuring the dimensional changes and the mechanical properties of these fiber assemblies. The experimental results indicate that one consequence of aging is a relaxation of stresses in the fibers caused by deformation of the fiber crimp during previous processing. A brief high-temperature, high-humidity treatment of the top balls or roving bobbins has many of the same effects on the properties of the top and roving as a long aging period at 65% R.H. and 70°F. 11 references.

Properties of apparel wools. Part 7. The mechanical behavior of roving

H. M. Burte (Textile Research Institute). *Textile Research J. 24:* 726-728 (August, 1954).

The rate of increase of force in the early region of the force-extension curve for roving depends strongly on the fiber crimp. The Hookean slope, when corrected for differences in the maximum load, can be used to characterize this rate of increase of the force, and is thus a useful parameter for investigating differences in fiber crimp among rovings made from various types of apparel wool. 3 references.

SPINNING, WINDING, TWISTING B 4

Doff load

M. C. Gross. *Textile World 104:* 102-105 (September, 1954).

Doff tables are given covering spindle loads from 35,000 to 40,000 spindles. To calculate doff load, find the proportional spindle load for the doff interval; then divide this spindle load by spindles per side or frame.

Dynamical analysis of the spinning balloon

G. M. Bracewell and K. Greenhalgh. *J. Textile Inst. 44:* T266-T292 (June, 1953).

Forces acting during ballooning of yarn on a ring spinning frame are studied with the object of obtaining general practical information relating to long-lift large-package spinning. Mathematical equations have been developed showing the interrelation of yarn tensions, traveler friction, and yarn friction. Tests under normal spinning conditions were carried out to cross-check the validity of the theory and its application to practice. The theory gives a fair representation of forces acting in a spinning balloon. However, new values must be found for each new machine.

Features and adaptability of the woolen ringframe

J. A. B. Mitchell. *Textile Mfr. 80:* 401-403 (August, 1954).

A discussion of the machine construction and method of preparing the frame for spinning, also the operational technique for efficient piecing-up, doffing the full cop, and bobbin replenishment.

The irregularity of cotton in spinning

V. Levi. *Industrie Textile:* 73-77, 175-178, 257-262, 324, 328 (1954); *in French.* Through *Brit. Cotton Ind. Research Assoc. 34:* 631 (August 31, 1954).

In this review, the author discusses factors affecting the regularity of yarn under the following heading: variations in weight (properties of the raw material, irregularities due to mechanical processes, mechanical defects and external factors); study of fiber distribution (random distribution and law of fiber distribution in the textile material); sampling; irregularity of slivers, rovings and yarn; physical and statistical interpretation of irregularity.

Results of a study on plastic travelers

J. Constant. *Industrie Textile:* 173-175 (March, 1954); *in French.* Through *Brit. Cotton Ind. Research Assoc. 34:* 585 (August 14, 1954).

Several attempts have been made to use thermoplastic materials in the manufacture of travelers, but experience has shown that these materials are liable to melt and deteriorate rapidly on account of the heat produced by friction. Moreover, the travelers are often deformed when subjected over a long period to the stress exerted by the yarn tension and centrifugal forces. It was found that these disadvantages can be eliminated by using travelers manufactured from urea- or phenol-formaldehyde condensation products and provided with an elastic element made of nylon or other polymerized substances of high tenacity. Various constructions are described and illustrated.

Spinners spin, cleaners clean

G. E. Tucker. *Textile Ind. 118:* 130-136 (September, 1954).

Advantages of and methods for setting up spinning and cleaning as two distinct jobs.

Uneven spinning drafts

N. H. Pomfret. *Textile World 104:* 109, 293-298 (September, 1954).

Sizing variations are caused mainly by carelessness, off-size rolls, and slipping rolls. One big cause for thick and thin places is eccentric rolls.

How to throw Helanca

T. B. Winston. *Textile World 104:* 69 (August, 1954).

Standard throwing equipment is used for stretch nylon, but special techniques are needed. High twist is put into the yarn, the yarn is set, and then the twist is backed out. Two yarns, one S and one Z twist, are plied to give a balanced construction.

Throwing tricot yarns

T. B. Winston. *Textile World 104:* 66-68 (September, 1954).

Features of tricot-yarn throwing at Jefferson Mills include: merge checks, compensating tension gates, transfer oil rolls, low-temperature conditioning, and conveyor handling in the coning room.

Rewinding filling from large packages

Whitin Rev. 21: 12-18 (July-August, 1954).

The Whitin Speed-Matic fully automatic winder, operating at 12,500 rpm, is claimed to reduce winding costs so much that mills can rewind at lower costs and higher counts. The advantages of large package spinning and rewinding are discussed and the winder is described.

Direct and indirect twisting-in

H.-P. Hartenhauer. *Textil- u. Faserstofftech. 4, No. 3:* 154-155 (1954); *in German.* Through *Brit. Cotton Ind. Research Assoc. 34:* 505 (July 15, 1954).

It is shown by examples that, in order to determine the twisting-in and twisting at the head (shortening or lengthening, respectively) percentage twisting-in should be calculated on the basis of yarn counts; the determination by means of the twist counter gives erroneous percentage values as compared with the actual lengthening or shortening of the yarn. In addition, it is advisable to measure the length before and after twisting. Factors affecting the determination include: yarn count, nature of the raw material (staple, fineness of the fiber, etc.), thread and yarn twist, number of doublings, twist direction, etc.

Handbook of twisting. Chapter 3. Part 1. Angle of twist

N. Truslow. *Textile Bull. 80:* 89-91 (August, 1954).

GENERAL B 5

Blending and spinning procedures for nylon staple

F. Millard and P. Thornton (British Nylon Spinners Ltd.). *Textile Merc. 131:* 326-333

(August 20, 1954); 372-377 (August 27, 1954).

Part 1, Woolen system; Part 2, Cotton system.

Blending cotton and nylon

J. R. Jones (E. I. du Pont de Nemours & Co.). *Textile World 104:* 64-65, 246 (September, 1954).

Low percentages (15 to 30%) of nylon can be blended satisfactorily with cotton at several processing points.

Coarse-denier blends

A. E. West. *Textile World 104:* 60-61 (September, 1954).

Permanently crisp, lightweight fabrics are attainable by blending 8.0- or 5.5-den. rayon with 1.5-den. stock. Processing is not adversely affected, and the application of resin finishes can be reduced by 50 to 75%. Spinning limits twice as high as those possible with 100% of 3-den. rayon can be achieved, or fabric crispness can be doubled. The two blends followed through indicate some of the possibilities.

Fiber blending

G. V. Lund (Courtaulds Inc.). *Textile Research J. 24:* 759-764 (August, 1954).

This paper discusses the inherent "greatest intimacy" of blending possible in a blend yarn of a particular construction, the effect or processing differences on the "intimacy" of a blend and the factors involved in long-term variation of the composition of a blend yarn, and suggests how the quality of blend yarns may be controlled. 5 references.

Fiber placement

E. R. Schwarz (Massachusetts Institute of Technology). *Am. Dyestuff Reptr. 43:* P589-P591 (August 30, 1954).

The author emphasizes the need for research on fiber placement in existing textile structure. He is also concerned with the possibility of placing individual fibers in specific, optimum positions as contrasted with present blending procedures. 6 references.

Fine counts in spun nylon yarns

A. Cooper (British Nylon Spinners Ltd.). *Textile Merc. 131:* 277-281 (August 13, 1954).

Developments in processing 1½ denier fiber on the cotton systems.

How to secure perfect blends

Saco-Lowell Bull. 26: 29-31 (July, 1954).

A mill blending test is described using three lots of the same cotton, one dyed red, one dyed blue, and one left natural. Colored photographs show the cotton at four stages of the blending process.

Irregularities of direct and Perlohrk spun yarns

K. Shirakashi, M. Tabata and Y. Numano. *J. Soc. Textile Cellulose Ind. Japan, 10, No. 3:* 111-116 (1954); *in Japanese (English summary).* Through *Brit. Cotton Ind. Research Assoc. 34:* 504 (July 15, 1954).

Novelty yarns

J. H. Blore. *Textile World 104:* 96-97 (September, 1954).

At Lorraine Yarn Mills nub yarns are made with irregularly rotated top rolls, ratine yarns are made with fast bottom rolls, and boucle yarns are made with S- and Z-twist yarns.

Processing Grilon

Textile Wkly. 54: 254-256 (July 23, 1954).

Methods of preparation, spinning, winding, etc., of this new polyamide fiber.

60-40 relaxed-unrelaxed Orlon top

Textile Ind. 118: 156-158 (September, 1954).

Production of 60-40 relaxed-unrelaxed Orlon top on the Turbo Stapler gives high-bulk yarn with a wooly hand. The process is described. The Warner & Swasey Pacific Converter method is also described.

Wool and nylon staple blends on the Bradford open drawing worsted system: further aspects of processing and yarn properties

H. Beevers, P. Thornton and D. Wilson. *J. Textile Inst. 44:* T335-T346 (July, 1953).

Work with stock ranging in content from 100% 50's cross-bred wool to 100% 6 denier 6 inch semi-dull nylon is reported on. Stock was processed from top to yarns. Data are given to indicate how, as the nylon content of yarns increased, the spinning efficiencies, count spinning limits, and yarn strengths increased. The evenness of the blended yarns produced is also given. 3 references.

Woolen and worsted yarn manufacture. Part 2. Twist yarns for weaving

Wool Record 86: 215-216 (July 22, 1954).

FABRICS C

WARPING, SLASHING, YARN PREPARATION C 1

Checking slasher performance

E. S. Rudnick (Wamsutta Mills). *Textile*

World 104: 64-65, 152-155 (August, 1954).

Single-strand test results are grouped on a single form for easy calculation and give data on strength, strength variation, and stretch before and after slashing. Boil-off tests check the accuracy of the quick size-content method used in the slasher room.

Controlling size-cooking pressure

Textile Ind. 118: 148-150 (September, 1954).

A six-months performance test in a New England sheeting mill established optimum size homogenizing pressure at 1500 psi. Automatic pressure controls were then installed.

Overwaxing warps

R. B. Pressley. *Textile World 104:* 62-63, 268-270 (September, 1954).

Cheraw Weaving Mill is adding a melted, water-soluble wax to sized nylon and Dacron warps at the slasher. Weave-room production has been raised 1½%. Cost for waxing a 3,000-yd. Dacron warp is only $1.66. Experiments are being made waxing warps without sizing.

Adjustable warp-tying machine

L. F. Vasina. *Tekstil. Prom. 14, No. 3:* 30-31 (1954); *in Russian.* Through *Brit. Cotton Ind. Research Assoc. 34:* 588 (August 14, 1954).

This automatic machine ties the thread ends of the finished warp with those of the new warp directly on the loom by means of a tailor's knot (leaving ends of about 20 mm), at a rate of 200-300 knots per minute and a density of the warp of 240-1000 ends per 10 cm. A brief description is given.

Properties of starched rayon-yarn bundles. Part 1. Physical properties

I. Suzuki and H. Sanuki. *J. Soc. Textile Cellulose Ind. Japan 10, No. 4:* 166-172 (1954); *in Japanese (English summary).*

Experimental study of pirn-winding: the effect of mixed sets on operative efficiency

R. Conrad and G. J. Siddall. *J. Textile Inst. 44:* P215-P222 (June, 1953).

Substantial differences in productivity can occur with mixed sets even when work loads and the number of spindles in the sets are equal. The results show that there may be other factors which play a great part in determining the efficiency of operators. The study was carried out in the pirn-winding room of a cotton textile mill.

Building motion of the winder. Part 2. Variations of the turning points and the distances of traverse in practical uses

G. Osawa. *J. Soc. Textile Cellulose Ind. Japan 10, No. 4:* 162-166 (1954); *in Japanese (English summary).*

Modern weft winding machines

W. B. Kaufmann. *Melliand Textilber. 35:* 407-411 (April, 1954); *in German.* Through *Brit. Cotton Ind. Research Assoc. 34:* 505 (July 15, 1954).

The most important weft winding machines developed recently are described and illustrated.

WEAVING C 2

Improvements on existing weaving looms

N. V. Machinefabriek L. te Strake. *Tex 13, No. 4:* 400-403 (1954); *in Dutch.* Through *Brit. Cotton Ind. Research Assoc. 34:* 548 (July 31, 1954).

A new clamping device, a warp-stretching device, and a new loom drive are described and illustrated (Dutch Patents 157 715, 183 392 and 184 431, respectively).

Minimum filling reserve on C & K all-purpose looms

E. P. Schremp. *Textile World 104:* 78, 256-258 (September, 1954).

A filling reserve of 4½ picks results in bobbins transferring correctly at the loom.

Nine causes of shuttle wear

J. M. Tuten (Draper Corp.). *Textile World 104:* 58-59 (August, 1954).

Most shuttle wear comes from neglect of lay parts and the mis-alignment that follows. This wear can be greatly reduced by following good loomfixing practices.

Reduce shuttle wear

W. R. Callaway. *Textile World 104:* 58-59 (August, 1954).

A checklist for longer shuttle life is given.

Reducing broken picks

W. C. Westbrook. *Textile World 104:* 94-95, 244-246 (September, 1954).

Fifty or more faulty conditions can cause broken picks. But four precautions in loomfixing can reduce and all but eliminate most of the faulty conditions.

Slashing and weaving worsted-synthetics gabardines

E. P. Schremp. *Textile World 104:* 74-75, 160-164 (August, 1954).

To weave fine gabardines from wool-synthetics blends slash warps with great care, align loom beams, and campaign against oil and grease stains.

Swells on silk and rayon looms

H. Barlow. *Textile Recorder 72:* 68-71 (August, 1954).

Different types of swells used in modern silk and rayon looms of British, American and Swiss make are examined.

Unconventional methods of weft insertion

A. T. C. Robinson. *Skinner's Silk & Rayon Record 28:* 832-835 (August, 1954).

Among the various types of looms discussed are the chenille loom, the Northrop rapier loom and the Sulzer weaving machine.

Use and mechanism of the three-shuttle patent reshuttling motion model CFA

W. Kleinert and K. Schille. *Textil- u. Faserstofftech. 4, No. 4:* 231-234 (1954); *in German.* Through *Brit. Cotton Ind. Research Assoc. 34:* 588 (August 14, 1954).

The change box motion for buckskin, model CFA, is described and illustrated.

Weave-room strain

R. B. Pressley. *Textile World 104:* 70-71 (September, 1954).

The spacing of looms, the auxiliary equipment, and the weave-room organization ease many of the problems normally connected with a small weave room.

Weft feeler motions

W. Middlebrook. *Textile Mfr. 80:* 361-363 (July, 1954).

The setting, operation and features of White's delayed action weft feeler motion, and the Northrop motions including the Midget weft feeler are described.

KNITTING C 3

Automatic devices for hosiery mills

C. A. Pembroke. *Textile Age 18:* 79-86 (September, 1954).

A number of new machines for eliminating or combining manual operations are described.

High-speed warp loom

E. W. Wirkmaschinenfabrik, East Germany. *Textile Wkly. 54:* 442 (August 6, 1954).

A new bearded needle warp knitting loom (Model Favorit) which is claimed to be working at a speed of 900-1,000 courses per minute.

Improved knitting machine

Mellor Bromley and Co. Ltd. *Textile Wkly. 54:* 444-446 (August 6, 1954).

A latch needle circular knitting machine with greater scope for patterning and shaping by means of a special two-tier cam box construction and increased number of feeders.

Intarsia knitter

C. C. Auton. *Textile Ind. 118:* 137-140 (September, 1954).

Operating pointers are given for the Intarsia V.I.P. Model Banner circular knitting machine.

Knit fabric shrinkage

H. M. Fletcher and S. H. Roberts (U. S. Agricultural Research Service). *Hosiery Underwear Rev. 37:* 81,95 (August, 1954).

How much garments made of circular plain knit fabrics will shrink and stretch in laundering is determined by the shape of the loops as they come from the finishing machine. The shrinkage of the yarn is negligible and contributes little to the dimensional stability of the fabric. Dimensional stability depends on finishing goods to obtain proper relationship of courses and wales. These findings were obtained from the study of 58 plain knit fabrics.

Knitting Taslan

J. H. Blore. *Textile World 104:* 72-73, 233 (September, 1954).

To get superior hosiery from Taslan yarn with less than 2% seconds apply more yarn tension during heel knitting, use nylon pull threads, and preboard at lower temperatures.

Latch needle circular knitter

Mellor Bromley and Co. Ltd. *Textile Mfr. 80:* 337-338 (July, 1954); *Textile Merc. 131:* 244-246 (August 6, 1954).

The cam box in this Mellor Bromley 5/RLG/8 machine is sub-divided into twelve sections, ten of which are numbered to correspond with the knitting feeders. The remaining two accommodate the selecting units, and they can also be used as auxiliary feeders for the laying-in of elastic yarn.

Movement timing and control. Part 1. Interlock machines

J. B. Lancashire. *Textile Recorder 72:* 72-74 (August, 1954).

In the first of six articles the author discusses some methods of automatic timing and control on interlock knitting machines.

Principles of weft knitting. Part 15. Fully-fashioned hose manufacture

S. B. Bradley. *Brit. Rayon and Silk J. 31:* 53-56 (July, 1954).

Modern machinery for nylon hose and variations on the round heel are discussed.

Steam cleaning knitting machines

J. H. Blore. *Textile World 104:* 90-91 (August, 1954).

Knitting troubles are reduced when size, oil, lint, and dirt are removed from sinkers, jacks, and sinker heads. The 45- and 66-gauge hosiery machines can be kept like new machines with a steam-cleaning unit.

Stockings: silk, cotton, rayon, nylon

A. W. Eley. Leicester: Hosiery Trade Journal, 1953. 226p. Through *Brit. Cotton Ind. Research Assoc. 34:* 549 (July 31, 1954).

This is the second edition, revised and enlarged, of a handbook for the distributive trades, published originally in 1946. It deals particularly with the manufacturing and finishing processes, but includes notes on the different fibers and their identification, and the inspection, selling and care of stockings.

Using Orlon in full-fashioned sweaters

J. W. Bolmeyer (E. I. du Pont de Nemours and Co.). *Knitter 18:* 46-48 (August, 1954).

A brief review of the contribution that Orlon is making in sweaters due to its properties, types of yarn that are available, and the general methods used in handling Orlon in full-fashioned knitting mills and the dye house.

Versatility and flexibility with Raschel machines. Part 2

C. A. Pembroke. *Textile Age 18:* 26-28 (August, 1954).

This is part 2 in a two-part discussion on new flexible features of the Reiner and Kidde Raschel knitting machines.

GENERAL C 4

Engineering design of fabric structures

W. J. Hamburger. *Can. Textile J. 71:* 39-41, 73-76 (September 24, 1954).

The role of certain inherent fiber properties and geometric form factors of fibers, yarns and fabrics is considered as they may be modified to effect desirable changes in some functional performance characteristics of textiles. Three end use requirements are selected as examples: (a) drape, (b) crease resistance, (c) ultimate strength. The inherent properties shown to be of importance to (a) and (b) are the elastic characteristics at low strains, such as bending modulus, energy index of elasticity and deformation index of elasticity. Since these indices of elasticity are dependent upon the magnitude of the strain level, the influence of geometric variables such as number of fibers, fiber moment of inertia, fiber and yarn radius, and degree of freedom of motion are considered. In the case of (c) the elastic properties at high strain levels and their variability, as well as form effects, are shown to be highly significant.

Relationship of the geometry of plain knit cotton fabric to its dimensional change and elastic properties

H. M. Fletcher and S. H. Roberts. *Textile Research J. 24:* 729-737 (August, 1954).

A study was made of the geometry of 34 different plain knit cotton fabrics which were knit, in a wide range of stiffness, of six different yarns. The study reveals the effect of the geometry of fabrics on their stress-strain properties as well as on dimensional changes in laundering. 5 references.

Better knit goods

F. J. Spagna. *Textile Ind. 118:* 151-153 (September, 1954).

Quartermaster research on heat loss by wicking is discussed briefly.

Mechanical requirements of stiff cloths for crinolines and similar heavy fabric structures

G. W. H. Stevens. *J. Textile Inst. 44:* T347-T357 (July, 1953).

In terms of support given to a full skirt, the efficiency of a stiff cloth made into a fully shaped foundation or into a folded foundation is compared to that of a system of hoops. A unilaterally stiff cloth appears to be as effective, if not more so, as a uniformly stiff cloth. The most significant conclusion is the finding of a critical filament size in a stiff cloth for crinoline.

Scientific aspects of the design of a full skirt

G. W. H. Stevens. *J. Textile Inst. 44:* P247-P257 (July, 1953).

Research into scientific aspects of full skirt design is described, and factors which dress designers must consider are pointed out. The article is mainly concerned with an account of the physics of the problem and of the results of mathematical analysis. The effect of physical properties of materials on hooped skirt design are discussed, particularly those of steel and nylon. 3 references.

Cloth setting reconsidered. Part 9

S. Brierley. *Textile Mfr. 80:* 371-373 (July, 1954).

Finishing processes should be considered in

setting the loom. Mending, shrinkage, scouring, and milling are discussed in their relation to cloth setting.

Cloth setting reconsidered. Part 10

S. Brierley. *Textile Mfr. 80:* 393-394, 425 (August, 1954).

The data in this article enable useful comparisons to be made which throw some light on other problems in cloth making. The results disprove that cloths made with different twill weaves are similarly set in the loom when made according to the diameter-intersection theory of cloth structure.

Further studies in textile design. Part 8. Complex double cloths

Textile Recorder 72: 78-79 (August, 1954).

Textile design and color

W. Watson. London: Longmans, 1954. 484p. Sixth edition. Through *Brit. Cotton Ind. Research Assoc. 34:* 549 (July 31, 1954).

The new edition of this work, which has been revised by Eric G. Taylor and James Buchan, differs from the fifth edition (1946) mainly in that an appendix on artificial fiber materials has been re-written from the point of view of the designer.

Faults in velveteen and Genoa back corduroy

Textil-Praxis 9: 344-347 (April, 1954); *in German.* Through *Brit. Cotton Ind. Research Assoc. 34:* 523 (July 15, 1954).

Warpway irregular and regular streaks in velveteen, streaks in the weft direction in Genoa back fabrics, napless patches, holes, and uncut places and their causes are discussed.

British trimmings machine

D. Brunnschweiler. *Skinner's Silk & Rayon Record 28:* 808-812 (August, 1954).

The garment and furnishings trimmings machines of Charles Leek and Sons Ltd. are described and illustrated.

Cross-dyed rayon crash

Am. Dyestuff Reptr. 68: 13-14 (August 5, 1954).

Unusual dobby weave effect is produced in fabric with spun rayon yarn in combination with thick and thin yarns in both warp and filling.

Novelty rayon faille

Am. Textile Reptr. 68: 15-18 (September 2, 1954).

Layout and description of rayon faille fabric containing a fine warp with a high construction in combination with a heavier filling yarn and a much smaller number of picks per inch.

Pellon

G. Boyo. *Modern Textiles Mag. 35:* 61-62 (August, 1954).

Pellon is a non-woven fabric made of 70 percent nylon, 20 percent cotton and 10 percent acetate. Pellon is flexible in all directions, is porous, light weight, does not ravel, is washable, and does not shrink. It is mainly used as an interlining. The story of its development is given.

FINISHES D

WET PROCESSES D 1

Bleaching of polyamide fibers with potassium permanganate

Sandoz A.G. *SVF Fachorgan Textilveredlung 9, No. 4:* 170-171 (1954); *in German.* Through *Brit. Cotton Ind. Research Assoc. 34:* 591 (August 14, 1954).

Although polyamide fibers, when bleached with potassium permanganate, show excellent whiteness, considerable quantities of the manganese salt are retained by the fibers and form, in presence of oxidizing washing agents (e.g., Persil) manganese oxide (pyrolusite) which imparts a brownish color to the fabric. The manganese can be removed to some extent from the fiber by acidification with hydrochloric or oxalic acid.

Acetate yarn develops wool-like crimp when immersed in boiling water

E. I. du Pont de Nemours and Co. *Textile Age 18:* 21 (August, 1954); *Modern Textiles Mag. 35:* 30-31 (August, 1954).

Properties, processing and crimping features of a new type acetate yarn, which has the property of developing a wool-like crimp when immersed in boiling water, are discussed. Called Type C acetate yarn, the new product develops a crimp which is said to be stable to laundering and dry cleaning.

Chemical effect of washing agents on cellulose fibers

R. Podewin. *Textil- u. Faserstofftech. 4, No. 3:* 175-177 (1954); *in German.* Through *Brit. Cotton Ind. Research Assoc. 34:* 509 (July 15, 1954).

A pressure-boiling method is described which can be satisfactorily used for rapid determination of the chemical effect of alkali and washing agents and auxiliaries on viscose fibers, for the development of fiber-protecting agents, and in production control. The evaluation of the results is carried out by means of the usual laboratory testing and

measuring devices, and the values obtained are accurate and reproducible.

Pneumatic mangle

Rodney Hunt Machine Co. *Textile World 104:* 103 (August, 1954).

The Niptrol pneumatic mangle maintains a constant nip of about 3/16 inch across the width of the roll at maximum working pressure of 250 lbs. per linear inch. Description and diagrams.

Improvement of luster of cotton. Part 9. Thermosetting resins

L. Fourt and H. J. Elliott (Harris Research Laboratories). *Textile Research J. 24:* 779-784 (August, 1954).

The range of increase of luster from the application of thermosetting resins in a cotton twill is found to be as large as that produced by mercerization and to be generally similar in appearance. Further increases in luster, as measured by contrast ratio, can be obtained by high pressure embossing, although the appearance of the embossed areas is different and can be recognized as flattened. Various types of urea formaldehyde and melamine formaldehyde resins are very similar in their effects on the luster of cloth, and variations in mechanical smoothing similar to tentering or light calendering have more influence on luster than the type of resin. The resins do differ, however, in their effect on wrinkle recovery, stiffness, and tensile and tear strength. Thus it appears that the chief effect of thermosetting resins on luster of fabrics is indirect, through their durable control of fabric structure. The direct effect of the resins on luster, as shown by tests on yarns, is to decrease the luster of mercerized cotton and only slightly to increase the luster of nonmercerized cotton. 11 references.

Resin finishing of cellulosic fabrics. Part 1. Treatment with formaldehyde in presence of hydrochloric acid as catalyst. Part 2. Treatment with formaldehyde in presence of inorganic and organic acid catalysts

S. Matsuzaki and T. Yanase. *J. Soc. Textile Cellulose Ind. Japan 10, No. 4:* 177-180; 180-185 (1954); *in Japanese (English summary).*

Fiber damage in a viscose tulle curtain

Sandoz AG. *SVF Fachorgan Textilveredlung 9, No. 4:* 68-170 (1954); *in German.* Through *Brit. Cotton Ind. Research Assoc. 34:* 599 (August 14, 1954).

A peculiar fiber damage in a net curtain is reported which, on microscopical examination, was found to be due to the growth of a fungus, *Aspergillus flavus oryzae.* Under favorable humidity conditions, this air-borne fungus grows rapidly on the viscose substrate and causes extensive damage to the fiber. Impregnation of the material with a finishing agent containing Antimucin (2-5 g/kg), salicylic acid, or thymol is recommended.

Possibilities and limitations of stable flame-proof finishes

K. Quehl. *Melliand Textilber. 35:* 434-439 (April, 1954); *in German.* Through *Brit. Cotton Ind. Research Assoc. 34:* 512 (July 15, 1954).

Developments in the weather- and wash-fast flame- and waterproof impregnations of textiles are reviewed, with special reference to experiences with chemical flame-proofing agents (particularly Aflamman) and their practical application to vegetable, animal, and synthetic fibers; dyeing problems; testing of the effects, and properties of the treated textiles.

Rot-proofing of cotton fabrics. Part 1

B. C. M. Dorset. *Textile Mfr. 80:* 421-425 (August, 1954).

The use of fungicides for making cotton immune to attack by fungi and bacteria and the enzyme products formed by these during their growth are discussed. Formulas given show how diverse are some of the chemical structures so far found to have fungicidal properties and how difficult it is to predict what new structures might be even more effective.

Modern single-bath waterproofing impregnation

W. Otto. *Textil-Praxis 9:* 367-369 (April, 1954); *in German.* Through *Brit. Cotton Ind. Research Assoc. 34:* 513 (July 15, 1954).

Waterproofing of textiles by means of dilute aqueous aluminum- or zirconium-containing paraffin emulsions (trade names are enumerated) is discussed and the methods for impregnating and for testing the water-repellency of the products are briefly reviewed.

Acetylation of cotton fabrics. Part 1

Textile Recorder 72: 75-77 (August, 1954).

The first of two articles dealing with the partial acetylation of cotton fabrics to enable them to withstand high temperatures and micro-biological attack. References to the literature.

Scent improvement of textiles

K. Bergwein. *Kosmetik-Parfum-Drogen-Rundschau Nos. 1/2:* 5-6 (1954; *in German.* Through *Chem. Abstracts 48, No. 9:* 5506 (1954).

A general description is given of the tech-

nology of the fixation of perfumes on textiles either directly or by means of perfumed sizing compounds, some of which are named.

Cotton. Part 2. Developments in finishing

A. Bolgiani. *Textile Mfr. 80:* 426-429 (August, 1954).

Scouring, bleaching, mercerizing and continuous dyeing, etc., are discussed.

DYEING AND PRINTING D 2

Development of piece-dyeing with pigments

H. U. Schmidlin. *SVF Fachorgan Textilveredlung 9, No. 4:* 156-161 (1954); *in German.* Through *Brit. Cotton Ind. Research Assoc. 34:* 592 (August 14, 1954).

Principles of pigment printing and piece-dyeing (pigments, binding agents, thickeners and finishing agents), method of application, fastness properties of pigment-dyed piece goods, uses of pigments, commercial products (trade names and manufacturers), and new developments (phthalocyanines) are reviewed and advantages of pigment dyeings are summarized.

Dyeing men's gabardine sports cloths. Part 1

Dyer 112: 115-118 (July 23, 1954).

Methods of dealing with larger batches and of attaining the high standard of levelness required.

Dyeing of Orlon and Dacron and blends

J. L. Laucius and P. L. Meunier. *Can. Textile J. 71:* 51-57 (September 10, 1954); 66-70 (September 24, 1954).

The authors summarize practical methods of dyeing Orlon acrylic fiber and Dacron polyester fiber and blends with other fibers. References.

Dyeing of Orlon and Terylene

G. Siegrist. *SVF Fachorgan Textilveredlung 9, No. 4:* 162-167 (1954); *in German.* Through *Brit. Cotton Ind. Research Assoc. 34:* 595 (August 14, 1954).

In this article, the author indicates methods for dyeing Terylene and Orlon 42 and gives tables to show the fastnesses that can be obtained with a suitable selection of dispersion dyes for Orlon 42 and polyester fibers. The range of acid dyes given is suitable for dyeing Orlon by the copper method.

Dyeing of polyacrylonitrile and polyvinylchloride fibers

H. Schonefeld. *Textil- u. Faserstofftech. 4, No. 5:* 302-308 (1954); *in German.* Through *Brit. Cotton Ind. Research Assoc. 34:* 641 (August 31, 1954).

The author discusses the chemical structure and dyeing properties of synthetic polymer fibers, and describes his new method of dyeing polyacrylonitrile fibers with carbocyclic bases which, after pretreatment of the material with a mordant, are oxidized in the bath to diazine-like compounds. Several so-called peri-dyes and chromotrope derivatives, and hydroxynaphthol sulfonic acids and sodium salts of leuco vat dyes can be fixed on the fibers under similar conditions. It was not possible to produce vivid green, blue and signal-red tints by oxidation of the organic bases. The method is applicable to the dyeing of polyvinyl chloride fibers at temperatures not exceeding 40°C; the dyeings are somewhat weaker and have a slightly lower resistance to rubbing and washing with soap.

Dyeing wool gabardine cloths. Part 2

Dyer 112: 195-199 (August 6, 1954).

Mordanting process, application of salting colors, and cleansing and fastness to rubbing.

Fast-to-gasfading acetate rayon dyes

A. J. Hall. *Fibres 15:* 255-258 (August, 1954).

A survey of the new acetate dyes which are fast-to-gasfading.

Flash aging speeds vat printing

J. W. Ogletree (Polymer Industries, Inc.). *Textile World 104:* 82-85, 262-268 (September, 1954).

Aging now takes 10 to 30 seconds instead of about 12 minutes. Colors are brighter, less dye is used, and the printed fabrics can be stored before aging and washing. The key to success is proper choice of thickeners and dyes. Diagrams.

High temperature sulfur dyeing of cotton

J. L. Taylor and W. A. Murauskas. *Textile Ind. 118:* 122-124 (September, 1954).

With the sulfur dyestuffs used, the results of high temperature dyeing of cotton were (1) increase in dyestuff exhaustion of from 5 to 34.2%, (2) one-third saving in time, (3) no significant loss of strength, and (4) no significant difference in wash or light fastness. 6 references.

How to trap lost profits in the print room. Part 2

D. V. Guillemette. *Textile Age 18:* 36-37 (August, 1954).

This is part 2 of a discussion on the profitable operation of textile printing. It follows an article

on this same subject which appeared in the August, 1953, issue of *Textile Age*.

Influence of the dyeing method on wool wearing properties

P. Fink. *Fibres 15:* 269-271 (August, 1954).

A summary of the work of Paul Fink originally published in German in the June, July, October, and November, 1953, issues of *Textil-Rundschau*. See *TTD 11:* 156 (April, 1954).

Pigment printing technique

G. Bertolina. *Textile Wkly. 54:* 286-290 (July 23, 1954); 336-370 (July 30, 1954).

Poor dye accessibility of Vinylon fibers

J. Takahashi and R. Tanaka. *J. Soc. Textile Cellulose Ind. Japan 10, No. 4:* 192-196 (1954); *in Japanese (English summary).* Through *Brit. Cotton Ind. Research Assoc. 34:* 596 (August 14, 1954).

Sulfuric acid and its salts are known to increase the affinity of Vinylon fibers for dyes. The reaction mechanism is not known, but a relationship between dye accessibility and degree of formalization was observed in Vinylon fibers treated with sulfuric acid and its salts.

The practice of dyeing. (Die Praxis der Farberei)

F. Weber and F. Gasser. Vienna: Springer, 1954. 851p. *In German*. Through *Brit. Cotton Ind. Research Assoc. 34:* 640 (August 31, 1954).

This practical text book has an introduction describing the textile fibers (natural, regenerated, synthetic) in which properties are tabulated and trade names are listed, and it is then divided into four parts: the first dealing with works and organization (building, plant, heating, water, dyeing and drying machinery, accident prevention, plant management calculations and costing, laboratory); the second with the application of dyes to loose materials, packages (cops, slubbing, cheeses, beams), yarns, woven fabrics, knitted fabrics, stockings, and miscellaneous materials; the third with defects in raw materials, preparatory processes, and in dyeing; and the fourth with dyes and textile chemicals. There is a glossary of the more important (German, English, and French) technical terms, a subject index, and a dyestuff index (German, Swiss, French, British and American products). The references are mainly to recent (-1953) German, American and British periodical literature.

Pre-dyed stretch yarns

Hosiery Underwear Rev. 37: 78-79 (August, 1954).

A pre-dyed stretch yarn which does not lose elasticity with washing, and does not bleed or fade, has been developed by G. W. Brooks of Belmont Throwing Corp. (USP 2 679 739, June 1, 1954). Use of this yarn in men's socks is described.

Progress report on new fibers, such as Orlon, Dacron, Terylene, Dynel, Acrilan and fiber X-51. Dyeing of Dynel, Acrilan and X-51

H. G. Frohlich. *Z. ges. Textil-Ind. 56, No. 8:* 447-450; *No. 11:* 691-693 (1954); *in German.* Through *Brit. Cotton Ind. Research Assoc. 34:* 596 (August 14, 1954).

The two articles comprise a literature review on the dyeing behavior of Orlon, Pan and Redon (pure polyacrylonitrile fibers) and Dynel, Acrilan, and X-51 (modified polyacrylonitrile fibers).

Shock setting spun acetate

M. Alpert. *Textile World 104:* 86 (September, 1954).

To eliminate crease marks in dyed spun-acetate fabrics, subject the fabric to a radical temperature change before it enters the boil-off unit.

Stripping. Part 1

I. Teplitz. *Textile Bull. 80:* 70-72 (August, 1954).

Problems, methods, and stripping agents are discussed.

Tinting fibers

E. A. Murray. *Textile World 104:* 69, 240-244 (September, 1954).

Tinting troubles can be minimized by checking fugitivity under plant conditions, using the minimum amount of tint, using the most concentrated dispersions possible, making sure powdered tints are completely dissolved, using low temperatures and humidities in steaming, and scouring fabric at the lowest possible temperatures.

Union dyeing of acetate- and viscose-blended fabrics. Part 1. Dyeing with acetate dyes

Y. Matsuda, T. Adachi and S. Matsutani. *J. Soc. Textile Cellulose Ind. Japan 10, No. 4:* 189-192 (1954); *in Japanese (English summary).* Through *Brit. Cotton Ind. Research Assoc. 34:* 594 (August 14, 1954).

Spectrophotometric examination of acetate rayon fabrics dyed with dispersion-type acetate dyes showed that there is a relationship between the stimulus value and dyeing temperature or dyeing time. Dyeing at high temperature (90°C) is more effective than at lower temperature (70°C)

in so far as the textiles are not being damaged. The colors are affected by the dyeing temperature; in the case of a non-blended dye, the purity increases with increasing temperature, whereas with blended dyes the dominant wavelength varies with the dyeing conditions.

Vat dyeing on packages

E. L. Caswell. *Modern Textiles Mag. 35:* 57-59 (August, 1954).

Special problems in vat dyeing are discussed and practical directions given for pigment and reduced dyeing.

Vigoureux printing

Textile World 104: 79,164 (Aug. 1954).

No other process can duplicate the even shades on worsted top dyed by Vigoureux printing. Chromium dyes are producing colors fast enough for men's-wear fabrics.

DRY PROCESSES D 3

Haas short loop fabric drier

Friedrich Hass GmbH, Germany. *Textile Merc. 131:* 454-455 (September 10, 1954).

Variations in tension are avoided by new suspension arrangements.

Improvement of nylon textiles. Part 1. Heat setting

T. Yasuda. *J. Soc. Textile Cellulose Ind. Japan 10, No. 4:* 185-189 (1954); *in Japanese (English summary).* Through *Brit. Cotton Ind. Research Assoc. 34:* 599 (August 14, 1954).

Effects of temperature, moisture, etc., on heat-setting of nylon textiles were investigated and a temperature above 160°C was found to be essentially necessary for the process. The final result depends both on crystallinity and orientation of the fibers.

Plasticizing machine for nylon stockings

Girland Engineering Co. Ltd. *Dyer 112:* 229 (August 6, 1954).

A new upright plasticizing machine for nylon stockings which is claimed to give greater output per unit of floor space.

Superheated-steam drying

M. London. *Textile World 104:* 84-85 (September, 1954).

High-temperature-steam drying is used at Cliffside Dyeing Corp. in finishing many different fabrics of a variety of blends, widths, and weights. The advantages obtained from this drying method include shorter drying space required, loftier fabrics with no resin migration obtained, and overdrying eliminated.

Zero-energy napper speed determined by nomogram

D. P. Adams (Massachusetts Institute of Technology). *Textile World 104:* 132 (August, 1954).

GENERAL D 4

Automatic process control in the finishing plant

L. Walter. *Textile Bull. 80:* 74-79 (August, 1954).

A general survey illustrated with diagrams and photographs.

TESTING AND MEASUREMENT E

FIBERS E 1

Air-flow method of measuring wool fiber fineness

S. L. Anderson (Wool Ind. Research Assoc.). *J. Textile Inst. 45:* P312-P316 (July, 1954).

The air-flow method of measuring wool fiber diameter is reviewed and the essential requirements of the apparatus are given in detail. The various sampling errors are discussed and figures for accuracy given. 5 references.

Direct measurement of hair softening at various relative humidities

D. F. Mowery, Jr. (Trinity College). *Textile Research J. 24:* 711-715 (August, 1954).

An interfacial tensiometer was adapted to measure the force which must be applied to a sharp razor blade to cut a single human hair. The relationship between softening, as measured in this way, and the water content of the hair at different humidities can be represented by a sigmoid curve. A graph is presented which relates softening of hair by water to changes in various geometric measurements of the hair. 7 references.

Identification of undyed bast and leaf fibers

J. N. Banks and P. Bembrick. *Textile Mfr. 80:* 375-376 (July, 1954).

Details and description of a testing method in which a division of the fibers into groups was followed by the elimination of each fiber type by further tests similar to those employed in qualitative chemical analysis.

Measurements of the influence of finishing agents on the friction of fibers

H. L. Roder. *J. Textile Inst. 44:* T247-T265 (June, 1953).

A method for finding static and dynamic coefficients of friction of short fibers is described, and a diagram of the apparatus used is given. Reproducible results are obtained, and tests may be carried out by girls accustomed to routine testing. Results obtained with finishes of various kinds on viscose staple fiber are described.

Micronaire testing of cotton samples in prevailing atmospheric conditions

J. T. Rouse and F. W. Schultz. Wash., U. S. Agricultural Marketing Service, 1954. 8p.

Previous studies indicate that, in tests using the Micronaire, differences in results caused by atmospheric conditions are affected most by the amount of fiber included in a standard weight specimen. The procedure used in this study was devised to adjust the weights of the specimens in order to compensate for moisture content in different atmospheric conditions, and thus provide reliable Micronaire results when controlled atmospheric conditions are not available. The objective of the study was to ascertain, by empirical tests, the accuracy of the reproducibility of the Micronaire results when this procedure is employed in a wide range of prevailing atmospheric conditions. The procedure is described in detail.

Speed up fiber fineness tests

J. Alberts (Vezelinstituut T.N.O.). *Textile Ind. 118:* 185-187 (September, 1954).

The author states that, in practice, exact weighing of Micronaire samples is not necessary. If sample weight is kept between 3.20 and 3.30 grams (49.37 to 50.92 grains) the resulting maximum deviation from the true Micronaire reading amounts to about 0.1 Micronaire unit. This difference can usually be tolerated. If a correction factor is applied, a sample weight anywhere in the range 2.90 to 3.55 grams (44.75 to 54.78 grains) can be used. Correction factors are given in two graphs, one for linear and one for curvilinear scales.

Textiles: measurement of fiber length in cotton and staple fiber

Swiss Standards Association. *Textil-Rundschau 9:* 206-223 (April, 1954); *in German.* Through *Brit. Cotton Ind. Research Assoc. 34:* 516 (July 15, 1954).

The specification SNV 96 4 13 refers to the 'brush' method for measuring fiber length; all fibers of a sample are arranged in form of the specified 'brush' whose cross section is measured at various places in order to deduce from it a fiber number diagram. The specification comprises the definition, sampling method, apparatus, measurement, and evaluation of the results obtained.

YARNS E 2

Constant tension continuous winding tester

Cook and Co. *Textile Wkly. 54:* 651-656 (August 27, 1954).

This British continuous winding yarn tester may be used for three distinct purposes: (1) for mill control, (2) for comparative tests, and (3) to show strength regularity. Standards can be set by it which will serve for subsequent control. The theory and practical uses are explained with charts, tables and examples.

Device for the measurement of thread slippage

H. E. Cowles. *J. Textile Inst. 44:* T293-T297 (June, 1953).

A device for measuring the tendency of yarns (in a fabric) to slip is described. It has proved useful in the assessment of resistance to yarn slippage in rayon and nylon apparel fabrics and determining differences in yarn slippage in washed and unwashed fabrics. 3 references.

Elastic elongation

K. Adam. *Textil-Praxis 9:* 333-334 (April, 1954); *in German.* Through *Brit. Cotton Ind. Research Assoc. 34:* 521 (July 15, 1954).

Of the two methods for determining elastic elongation described by the German Standard Specification DIN DVM 3801 IV E6 (stage-wise loading and testing at 2/3 of the breaking load), the method of testing the yarn at 2/3 of the breaking load is found more suitable and sufficiently accurate for practical purposes. It can be easily carried out on any yarn-strength tester, and is particularly useful for control tests in the sizing machine. A yarn which retains up to 2 per cent of its elastic elongation after sizing, can be expected to give satisfactory results during weaving.

Electronic aids to quality control

Textile Merc. 131: 142-143, 161-163 (July 23, 1954); *Skinner's Silk & Rayon Record 28:* 832-835 (August, 1954).

Research and testing equipment at the Manchester exhibition in England is described briefly. The Fielden card regularity recorder (including a diagram) and the British Rayon Research Association's yarn irregularity recorder, electronic yarn tensiometer, and cloth profile recorder are included.

Irregularity of slivers. Part 3

H. C. Picard. *J. Textile Inst. 44:* T307-T316 (July, 1953).

Formulae are derived for the serial correlation

R (r) of the count. R (r) is the correlation of all pairs of local counts (weights per unit length) in pairs of cross-sections on a distance, r. 12 references.

Knitting quality control

J. H. Blore. *Textile World 104:* 66-68 (August, 1954).

Soowal Knitting Mills maintains consistency in high-quality products by checking all yarns for size, twist, appearance, moisture content, and oil content.

Measurement of the twisting moment in fibers and yarn. Part 2. Other gravity methods

G. Osawa and H. Nakamichi. *J. Soc. Textile Cellulose Ind. Japan 10, No. 4:* 196-201 (1954); *in Japanese (English summary).*

Tension analyzer for textiles to improve fabric appearance

Brush Electronics Co. *Textile Ind. 118:* 195 (September, 1954).

The Brush Tension Analyzer, developed in cooperation with the Textile Research Department of American Viscose Corp., is a complete unit for accurately measuring and recording instantaneous tension loads in filamentary materials.

Yarn imperfection counter

Sheffield Corp. *Textile World 104:* 116 (September, 1954).

The Neptel is an electronic instrument for counting yarn imperfections such as neps, motes, naps, etc. It tests 50 yards of yarn in 30 seconds. Total imperfectioons are read directly.

FABRICS E 3

Class test guide: Federal Flammable Fabrics Act

Modern Textiles Mag. 35: 41-44 (August, 1954).

For use in compliance with rule 7, Federal Trade Commission rules and regulations. A ready reference to the class tests which have been prepared by the Combined Textile Associations.

Determination of the nature of fabric surface

R. Weber. *Textil- u. Faserstofftech. 4, No. 3:* 177-180 (1954); *in German.* Through *Brit. Cotton Ind Research Assoc. 34:* 523 (July 15, 1954).

A recently developed device (supplementing the tear-strength tester) for testing the surface characteristics of fabrics and the corresponding method are described. A series of tests carried out with this apparatus on five different fabrics showed that the friction values obtained agree with the subjectively determined feel of the fabrics, and that there is a distinct relationship between incrustation of the fabric and friction value.

Extension measurements on technical textiles

W. Frenzel and G. Uhlemann. *Faserforsch. u. Textiltech. 5, No. 5:* 187-192 (1954); *in German.* Through *Brit. Cotton Ind. Research Assoc. 34:* 652 (August 31, 1954).

The importance of extensibility of technical textiles and of its determination is pointed out, and tests on four different fabrics, one hemp cord and one cotton rope are described to show the necessity of applying, in the case of high-tenacity fabrics, ropes, etc., a correction which takes into account the fact that the sample slips out of the clamp jaws under increasing loads. The Buschmann tester has been found satisfactory for the samples examined. The construction of an extensiometer, which automatically records the course of extension as load-extension curve, is also described.

How the Flammable Fabrics Act affects you

M. London. *Textile World 104:* 55-58, 298-302 (September, 1954).

Fabric classes, testing, and guarantees are discussed and tabulated.

Methods of determining the fastness properties of dyed textiles

F. W. Bradley (Clayton Dyestuffs Co. Ltd.). *Textile Merc. 131:* 286-292, 294 (August 13, 1954).

Tests and standards for fastness to light, washing, water, perspiration, bacterial action, rubbing, bleaching, etc., are considered.

Rapid test for gas-fading resistance of dyed cellulose acetate fabrics

H. M. Friedman (Emkay Chemical Co.). *Am. Dyestuff Reptr. 43:* 597-598 (August 30, 1954).

This procedure is not intended to be used in place of the recognized AATCC test method. It is suggested by the author as a relative procedure which shows promise as a spot test in giving a differentiation between fabrics which are definitely good to gas fading as against those that are definitely poor to gas fading. The equipment is not specialized and is easily available at low cost. 5 references.

Testing the serviceability of textiles. Part 5. Wear tests with stockings

H. Bohringer and F. Bolland. *Faserforsch. u. Textiltech. 5, No. 5:* 193-203 (1954); *in German.* Summary in *Brit. Cotton Ind. Research Assoc. 34:* 653 (August 31, 1954).

GENERAL E 4

Application of radioactive tracer techniques to textile research

H. J. White, Jr. *J. Soc. Dyers Colourists 70:* 284-287 (July, 1954).

Some properties of radioactive tracers are reviewed briefly, and the advantages of their unique properties are pointed out. Several applications of tracer techniques to problems dealing with fibers are described. 16 references.

How to use short-cut statistics

F. Proschan and A. R. Babcock, Jr. *Chem. Eng. 61:* 193-197 (September, 1954).

Illustration of statistical methods for measurement of the reliability of averages in a series of tests. The short-cut consists of using the average range in place of the normally used standard deviation and standard error.

Linear programming

W. W. Cooper and A. Charnes. *Sci. American 191:* 21-23 (August, 1954).

Linear programming is shown to be a method of pure mathematics that can be applied to human affairs and used to calculate the best possible solution to a problem that involves a number of variables.

Method for the quantitative determination of Ardil in admixture with wool

R. Preston and N. Warburton. *J. Textile Inst. 44:* T298-T304 (June, 1953).

The method proposed may be used on stock in the form of top, yarn, or cloth. It is based on the preferential solubility of wool in a solution of barium hydroxide and potassium or sodium nitrate. 2 references.

Reactions and identifications of polyvinyl and acrylic compounds encountered in textile finish and fiber analysis

H. Rath. *Textil-Rundschau 9:* 196-201 (April, 1954); *in German.*

Summary in *Brit. Rayon and Silk J. 31:* 74 (June, 1954) and in *Chem. Abstr. 48:* 10351 (1954).

Reactivity and detection of polyvinyl and polyacrylic compounds in finishes and fibers

H. Rath. *Textil-Rundschau 9:* 196-201 (April, 1954); *in German.* Summary in *Brit. Cotton Ind. Research Assoc. 34:* 512 (July 15, 1954).

Textile testing: how to use the results

A. Brearley (Wool Industries Research Assoc.). *Fibres 15:* 303-304 (September, 1954).

Explanation of three statistical tools: the standard deviation, the n-formula for determining sample size, and the t-test for significance of difference between averages. 9 references.

INDUSTRIAL ENGINEERING F

MACHINERY AND MAINTENANCE F 1

Bibliography of materials handling films

American Material Handling Society. *Modern Materials Handling 9:* 109-117 (August, 1954).

These films are devoted specifically to industrial materials handling. They contain basic handling information that can be applied to advantage in selecting equipment, improving methods, and selling ideas to management. Films are listed under major headings and under each heading they are grouped alphabetically by company.

Matching electrical characteristics to textile machine drive requirements

R. E. Parker (General Electric Co.). *Textile Age 18:* 12-17 (August, 1954).

The author suggests that the best procedure is to go into the area between the ideal drive and the obviously inadequate drive and select the practical drive which is as close to the ideal as economics will permit. The various types of electric drive are described.

PRODUCTION F 2

Acceptance sampling plan

R. R. Jones (Bigelow-Sanford Carpet Co.). *Textile World 104:* 94-95, 140 (August, 1954).

Supplies that are purchased by the lot can be controlled with an acceptance sampling plan if desired quality levels and risks are known. A yarn-strength example shows how such a plan is selected and applied.

Cloth costing calculations

N. C. Gee. *Textile Mfr. 80:* 417-420 (August, 1954).

Costing arrangements vary considerably depending on the processes, etc., involved. Some idea of the extent of these variations is apparent from the worked examples and exercises appearing in this article.

Finishing plant

M. London. *Textile World 104:* 71-73, 166 (August, 1954).

The Cooleemee finishing plant of Erwin Mills, Inc., processes up to 2,000,000 yds. of cloth per week without accumulating material between any operations. Need for storage space has been eliminated through efficient layout of equipment, synchronization of processes, and spare equipment to reprocess work.

QUALITY AND WASTE F 3

Statistical quality control

Oakland 8, Calif., Marchant Calculators, Inc., 1954. 51p. Free on request.

A profusely illustrated booklet explaining in simple definitions the function of frequency distributions, normal curves, control charts, sampling plans, operating characteristic curves and related statistical concepts. Among the control charts are charts for averages, ranges, modified-limits, dimensional, percent-defective and defect-per-unit. Convenient specimen forms for simplification of paperwork in recording and charting test results are furnished as an aid in the administration and operation of a statistical quality control program.

GENERAL F 4

Mill of the future. Part 2. 1000 loom cotton mill

E. Blakewood and R. Stopfel. *Textile Age 18:* 38-41 (August, 1954).

This is Modern Mill Design No. 2 in a series which is based on work done by a group of students in the School of Architecture at the Massachusetts Institute of Technology.

Mill of the future. Part 3. Design for a 600 loom cotton mill

M. Fraser. *Textile Age 18:* 90-95 (September, 1954).

Modern Mill Design No. 3 in a series based on work done by students in the School of Architecture at the Massachusetts Institute of Technology.

SCIENCES G

CHEMISTRY G 1

Chemistry and textile uses of sequestering agents

J. V. Summersgill. *J. Soc. Dyers Colourists 70:* 278-283 (July, 1954).

Certain compounds which are capable of forming complexes with metals are potentially useful for the prevention of undesirable effects due to metals frequently encountered in textile processing. The nature of the reaction between such compounds and metals is discussed with reference to derivatives of imino-diacetic acid and complex phosphates. Some applications of these compounds in the prevention of troubles caused by calcium, magnesium, iron, copper, and some other metals are outlined. 16 references.

Content of carboxyl groups and thermal degradation of cellulose

T. N. Kleinert and W. Wincor. *Textil-Rundschau 9:* 201-205 (April, 1954); *in German.* Through *Brit. Cotton Ind. Research Assoc. 34:* 513 (July 15, 1954).

Experiments on technical celluloses and viscose fibers show that the thermal stability of cellulosic materials can be improved by saturating the free carboxyl groups with calcium. The free carboxyl groups present in de-calcified materials not only impair thermal stability, but also reduce the degree of whiteness and produce yellowing on prolonged heating.

Evaluation of textile chemicals

P. V. Seydel (Seydel-Woolley and Co.). *Textile Ind. 118:* 114-121, 253-255 (September, 1954).

The purpose of this article is to bring together in one place the conclusions obtained from work done in different laboratories and plants by men interested in the application of textile chemicals; to organize it, point to references for those who would like further details, and comment on evaluation of textile chemicals from the experience of the author and his associates. Bibliography.

Index of sulfonated oils and modern detergents. Volume 2. (Index des Huiles Sulfonees et Detergents Modernes)

J. P. Sisley. Paris: Editions Teintex, 1954. 657p. *In French.* Through *Brit. Cotton Ind. Research Assoc. 34:* 639 (August 31, 1954).

This volume, which supplements the information given in the original work published in 1949, describes nearly 3,000 additional products.

Laboratory apparatus for detergency studies

W. A. Straw. *J. Soc. Dyers Colourists 70:* 288-293 (July, 1954).

An apparatus is described for providing controlled mechanical agitation of chopped fiber in detergent liquors on a laboratory scale, employing relatively low liquor:fiber ratios. Thermostatic temperature control is provided, and by means of calibration graphs, temperature-time conditions

can be selected to follow industrial practice. An estimate is given of the accuracy of speed and temperature control. 11 references.

Nonionic surfactants: their chemistry and textile uses

C. F. Jelinek and R. L. Mayhew (General Aniline & Film Corp.). *Textile Research J. 24:* 765-778 (August, 1954).

This paper describes how the physical properties, chemical properties, and performance characteristics of nonionics are affected by changes in chemical structure, and what this variation of properties with structure means in terms of specific applications in the textile industry. Generalizations are made which stress the strong points of the nonionics and at the same time point out their limitations for certain uses. 27 references.

Reaction of cotton with Beta-propiolactone in the presence of organic solvents. Part 1. Purified cotton

G. C. Daul, R. M. Reinhardt and J. D. Reid (Southern Regional Research Laboratory). *Textile Research J. 24:* 738-743 (August, 1954).

β-propiolactone was reacted with purified cotton in the presence of organic solvents. The reaction was found to be affected by time, temperature, and concentration of reagents. Weight gains of upwards of 60% were obtained. In all reactions of purified cotton with β-propiolactone in organic solvents, etherification occurs, apparently followed by polyesterification of the attached groups by additional lactone. Attempts to direct the reaction towards either etherification or esterification by means of acid and base catalysis were not successful. Increases in the extent of reaction were obtained by "activation" of purified cotton with acetic acid prior to the treatments with β-propiolactone. 12 references.

Reaction of cotton with Beta-propiolactone in the presence of organic solvents. Part 2. Raw cotton

G. C. Daul, R. M. Reinhardt and J. D. Reid (Southern Regional Research Laboratory). *Textile Research J. 24:* 744-747 (August, 1954).

Factors which influence the reaction between raw cotton and β-propiolactone were studied. It was found that the noncellulosic alkaline salts, naturally present in raw cotton, catalyze the reaction and make possible weight gains of over 200%. Mercerization, increase in twist, and the presence of natural waxes and of excess moisture adversely affect the reaction. The extent of reaction depends upon time, temperature, and the concentration of reagents, as with purified cotton. Prepolymerized β-propiolactone will not react to any appreciable extent with raw cotton. 9 references.

Swelling powers of urea solutions on cellulose

J. M. Preston, J. F. Clark, W. R. Beath and M. V. Nimkar (Univ. of Manchester). *J. Textile Inst. 45:* T504-T509 (July, 1954).

Some effects of urea solutions on cellulose fibers have been studied. Swelling of native and regenerated cellulose fibers, loss of strength of the latter and the ease of stripping acid dyes all increase with the concentration of the urea solutions. 14 references.

Synthetic detergents: symposium

Ind. Eng. Chem. 46: 1913-1947 (September, 1954).

This symposium on synthetic detergents was held by the ACS Division of Industrial and Engineering Chemistry in Kansas City. It reports the current status of developments in syndets—their properties and uses, production, and performance. The materials discussed include fatty alcohols, alkylbenzenes, alkylates, sodium phosphates, and nonionic detergents.

The uses of cyanamide and its derivatives in textile chemistry

D. Fornelli. *Tinctoria 51, No. 3:* 80-87; *No. 5:* 161-166 (1954); *in Italian.* Through *Brit. Cotton Ind. Research Assoc. 34:* 557 (July 31, 1954).

In this review, the author discusses the properties of cyanamide and its derivatives and describes their uses in the preparation of synthetic fibers, as water-proofing and anti-creasing agents, in the preparation of light-excluding material (mat finishes for rayon), as finishing and anti-felting agents, and in animalizing cellulosic fibers. 127 patent references are quoted.

PHYSICS G 2

The processing possibilities of ultrasonics

O. Mattiat. *J. Acoust. Soc. Amer. 26, No. 2:* 241-243 (1954). Through *Brit. Cotton Ind. Research Assoc. 34:* 591 (August 14, 1954).

Processing possibilities of ultrasonics which have led to industrial applications or which seem quite promising are reviewed. Among them are ultrasonic maturing of liquids, dispersing of dyes and pigments, and emulsification.

Static electricity and antistatic agents

G. Trinchieri. *Textile Age 18:* 70-76 (September, 1954).

A general survey of static electricity and textiles with a list of some of the antistatic agents on the market.

PATENT CHECKLIST

U. S. Patents may be obtained from the U. S. Patent Office, Washington 25, D. C., for 25 cents per copy. Photostatic copies of foreign patents are available. Charges for these photostats are based on the number of pages in the patent.

YARNS B

OPENING AND PICKING B 1

Apparatus for opening and cleaning fibrous material

B. Bisinger. BP 703 376, February 3, 1954.

Method and device for producing laps from textile fibers

K. Strassler (to Ioh. Jacob Rieter & Cie, Switzerland). USP 2 686 014, August 10, 1954.

Press box for treating fibrous material

H. M. Waddle, G. O. Etchison, H. A. Gibson and E. H. Granberry (to West Point Mfg. Co.). USP 2 687 689, August 31, 1954.

Spraying oil or water on textiles

R. Schlumberger. BP 708 520. Through *J. Soc. Dyers Colourists 70:* 303 (July, 1954).

An atomiser for oiling or moistening textiles, e.g. cotton lap, is so devised that the spray is automatically cut off if the flow of material stops, thus avoiding local saturation. The pressure in the system is fully maintained so that the spray operates again immediately the fabric starts to move.

CARDING AND COMBING B 2

Carding or sliver cans

F. McGee. BP 702 798, January 20, 1954.

Cleaning devices for carding engines

J. Schmidt-Engasser (France). BP 702 713, January 20, 1954.

DRAWING AND ROVING B 3

Apparatus for collecting dust, fibrous waste and like waste material for use in drawing or roving machines

J. C. Heslip (to William Ewart & Son Ltd.). BP 703 001, January 27, 1954.

Double belt drafting mechanisms for textile spinning machines

Deutscher Spinnereimaschinenbau Ingolstadt (Germany). BP 702 404, January 13, 1954.

Drafting apparatus for textile fibers

J. Noguera (to Casablancas High Draft Co. Ltd.). USP 2 686 938, August 24, 1954.

Drafting mechanisms for textile fibers

J. Noguera (to Casablancas High Draft Co. Ltd.). BP 702 102, January 6, 1954.

Drawing frame or system comprising an endless belt for conveying the fibrous material in slubbing, roving, and spinning frames

J. J. Keyser (to Schiess AG, Switzerland). USP 2 686 939, August 24, 1954.

High-draft drawing mechanisms for textile spinning and preparatory machines

Zellwolle-Lehrspinnerei GmbH (Germany). BP 702 044, January 6, 1954.

Method of forming laps from card slivers on sliver lap machines

J. J. Rieter & Cie AG (Switzerland). BP 703 639, February 10, 1954.

Roller weight means for use in spinning and preparatory machines

J. Noguera (to Casablancas High Draft Co. Ltd.). BP 702 784, January 20, 1954.

Textile drawing mechanism

V. A. Burnham (to Saco-Lowell Shops). USP 2 686 940, August 24, 1954.

Top rollers for textile spinning and preparatory machinery

J. Noguera (to Casablancas High Draft Co. Ltd.). BP 702 095, January 6, 1954.

SPINNING, WINDING, TWISTING B 4

Automatic clutches for ring spinning spindles fitted with anti-ballooning caps

J. J. Haythornthwaite (to T.M.M. (Research) Ltd.). BP 704 037, February 17, 1954.

Direct spinning

A. K. Cocke and R. Woodell (to E. I. du Pont de Nemours & Co.). USP 2 688 160, September 7, 1954.

Guide, especially for spindle rails or ring rails in spinning and twisting frames

Prototypa, Nar. Pod. (Czechoslovakia). BP 702 938, January 27, 1954.

Method and apparatus for preventing the formation of a balloon in spinning

W. J. Netelenbos, M. Otger and J. G. Robbenhaar. BP 702 956, January 27, 1954.

Pressure mechanism for the rollers of spinning and like machines

R. B. Solanas (to Estirajes Balmes). USP 2 688 162, September 7, 1954.

Rings for textile ring spinning machines

T. K. Kaisha and N. Kobayashi. BP 702 937, January 27, 1954.

Textile spinning and analogous machines

W. H. Watson and R. Morris (to T.M.M. (Research) Ltd.). BP 702 618, January 20, 1954.

In ring spinning frames on which the formation of balloons is prevented by an appliance fitted to the top of the spindle—this appliance causing the yarn to form coils about the spindle before it reaches the traveller—the yarn is removed from the anti-ballooning appliance and allowed to form a balloon just before doffing. The advantage of the device is the time saved by the operator through not having to uncoil the yarn from the spindle prior to removing the yarn package.

Yarn guide for spinning, twisting or cabling yarns

I. Frenkel (France). BP 702 047, January 6, 1954.

Yarn handling means for winder

J. W. May (to Deering Milliken Research Trust). USP 2 687 853, August 31, 1954.

GENERAL B 5

Apparatus for facilitating the bundling together of hanks of yarn

W. A. Frederikse. BP 704 778, March 3, 1954.

Mercerized cotton yarn

W. F. Luther. USP 2 686 955, August 24, 1954.

Method and apparatus for obtaining uniform tension in tow

I. A. Schwartz. USP 2 686 937, August 24, 1954.

Method of and device for cutting filaments, threads, slivers and like textile materials

Farbenfabriken Bayer (Germany). BP 706 375, March 31, 1954.

FABRICS C

WARPING, SLASHING, YARN PREPARATION C 1

Controlling the degree of stretch in a yarn sizing machine

F. Holt (to Thomas Holt Ltd.). BP 702 522, January 20, 1954.

Method of sizing water-insoluble nylon warp yarns

E. H. Rossin and M. J. Scott (to Monsanto Chemical Co.). USP 2 686 137, August 10, 1954.

Device for swinging the warp beam of warping machines into and out of working position

S. Furst (to Walter Reiners, Germany). USP 2 685 726, August 10, 1954.

Knot tying device

A. Shortland (to Mellor Bromley & Co. Ltd.). BP 702 347, January 13, 1954.

Knots and methods of forming the same

A. Shortland (to Mellor Bromley & Co. Ltd.). BP 702 348, January 13, 1954.

Adjustable skein holders

G. Soulal. BP 705 239, March 10, 1954.

Antistatic dressing for processing of textile yarns, threads, filaments and the like

P. A. Winsor (to Shell Refining and Marketing Co. Ltd.). BP 703 499, February 3, 1954.

Cheese winding

H. C. Rooney and C. N. Grindlay (to Courtaulds Ltd.). BP 704 376, February 17, 1954.

Driving arrangements for the thread traverse guides of devices for cross winding yarn packages

A. Freudenberg (to Barmer Maschinenfabrik AG). BP 705 782, March 17, 1954.

Electric motor control system for spooling apparatus

C. O. Bruestle (to Syncro Machine Co.). BP 705 699, March 17, 1954.

Feed traverse mechanism for pirn winders or the like

H. L. Muschamp and J. R. Grady. BP 705 709, March 17, 1954.

Manufacture of moulded plastic cotton reels

G. A. Rohan (to Alfa Plastics Ltd.). BP 705 314, March 10, 1954.

Split drum for winders producing cheeses

J. J. Rieter & Cie AG (Switzerland). BP 705 704, March 17, 1954.

Thread or yarn winding machines

W. Halstenbach, C. G. Rosenkranz and A. Plutte (to Halstenbach & Co.). BP 706 153, March 24, 1954.

Traverse or builder mechanisms in textile winding machines

F. A. Smith (to British Nylon Spinners Ltd.). BP 704 173, February 17, 1954.

Warping creels for textile threads or filaments

E. Brierley (to Thomas Holt Ltd.). BP 703 330, February 3, 1954.

Winding machines

Maschinenfabrik Schweiter AG (Switzerland). BP 705 997, March 24, 1954.

WEAVING C 2

Arrangement for stopping and starting a loom provided with automatic shuttle changing means

Société de Montage pour l'Industrie Mécanique (France). BP 704 694, February 24, 1954.

Circular looms

G. Casati and C. Cazzaniga (Italy). BP 705 201, March 10, 1954.

Cloth roll mounting for narrow ware looms

E. R. Holmes (to Crompton & Knowles Loom Works). USP 2 685 896, August 10, 1954.

Cloth roller driving motion for looms for weaving

H. G. Hales, W. Brown and A. Frost. BP 705 425, March 10, 1954.

Continuous path gripper shuttle loom

V. Werner and K. Kubelka (Czechoslovakia). USP 2 688 345, September 7, 1954.

Device to check a weft thread for unwinding in a circular loom

Saint Frères, Soc. Anon. (France). BP 703 702, February 10, 1954.

Dobby for the operation of heald shafts

Prototypa Nar. Pod. (Czechoslovakia). BP 703 280, February 3, 1954.

Drive of weft inserters in shuttleless looms

R. Dewas (France). USP 2 688 344, September 7, 1954.

Electrical warp stop motions for looms

I. S. Porter (to Wilson & Longbottom Ltd.). BP 705 494, March 17, 1954.

Harness actuating mechanism for looms

E. M. Moir. USP 2 687 751, August 31, 1954.

Loom for weaving fabric with projecting loops

B. E. Fitts. USP 2 686 537, August 17, 1954.

Looms with automatic cop loaders

D. W. Shimwell. BP 705 296, March 10, 1954.

Looms with stationary weft supply

W. H. Frost. BP 704 242, February 17, 1954.

Machines for producing pile fabrics

R. Laing (to Paerse-Laing Ltd.). BP 704 335, February 17, 1954.

Manufacture of pile fabrics

G. C. Ahier, A. V. Champagnat and J. F. Tirmont (France). BP 702 460, January 20, 1954.

Manufacture of single and multi-frame jacquard woven carpets

D. B. Parlin (to Bigelow-Sanford Carpet Co. Inc.). USP 2 685 894, August 10, 1954.

Mechanism for actuating the heddle frames in looms

E. Pfarrwaller (to Sulzer Frères, Soc. Anon.). USP 2 687 148, August 24, 1954.

Mechanism for controlling the operation of the heddle frames of looms

G. A. Weingartner (to Globe Woven Belting Co. Inc.). USP 2 687 750, August 31, 1954.

Motion for the insertion and withdrawal of the pile wires in looms for weaving pile fabrics

I. S. Porter (to Wilson & Longbottom Ltd.). BP 704 401, February 24, 1954.

Picking stick and picker arrangements in looms

Fibre et Mica (France). BP 703 857, February 10, 1954.

Pneumatic picking motion for looms

J. Heaton (to Electro-Pneumatic Looms Ltd.). BP 705 154, March 10, 1954.

Rotating looms

A. Gentilini (Italy). BP 705 064, March 10, 1954.

Stopping and starting control for looms for weaving

F. Davies (to British Cotton Industry Research Assoc.). BP 705 058, March 10, 1954.

Weighting motions for the warp beams of looms for weaving

T. Gill (to Joseph Sunderland Sons & Co. Ltd.). BP 702 076, January 6, 1954.

KNITTING C 3

Automatic stitch length control mechanism for knitting machines

V. T. Stack (to Hanes Hosiery Mills Co.). USP 2 685 786, August 10, 1954.

Drive for the knitting tools or warp knitting machines

A. Zwingenberger. USP 2 686 409, August 17, 1954.

Knitted fabric and method of making same

H. H. Marum (to Marum Knitting Mills, Inc.). USP 2 685 789, August 10, 1954.

Knitting machine needle

H. C. Noe (to Kidde Mfg. Co.). USP 2 685 787, August 10, 1954.

Machine for the manufacture of knitted fabrics having plain and back stitches

F. P. Capdevila (Spain). USP 2 685 785, August 10, 1954.

Straight bar knitting machine and a method for operating same

F. Lambach (to Robert Reiner, Inc.). USP 2 685 788, August 10, 1954.

Straight bar knitting machine

F. Lambach (to Robert Reiner, Inc.). USP 2 687 629, August 31, 1954.

Warp knitting machine

J. Merkel (Germany). USP 2 687 027, August 24, 1954.

Warp knitting machine with thread-separating means

K. Liebrandt and A. Zwingenberger (Germany). USP 2 686 411, August 17, 1954.

Yarn carrier for hosiery knitting machines

L. Barrett (to D. L. Subin). USP 2 686 410, August 17, 1954.

GENERAL C 4

Articles of clothing impervious to x-rays and beta-rays

S. Holt (to Imperial Chemical Industries Ltd.). BP 703 153, January 27, 1954.

Bonded fabric and method for producing the same

J. L. D. Oakley (to International Cellucotton Products Co.). BP 703 345, February 3, 1954.

Composite transparent plastic material having oriented fibers

P. Boone. USP 2 687 673, August 31, 1954.

Fabrics made of adhesively bonded textile fibers

Johnson & Johnson (Gt. Britain) Ltd. BP 705 057, March 10, 1954.

Manufacture of carpets and similar fabrics having a tufted surface

E. T. C. Brinton (to Brintons Ltd.). BP 703 075, January 27, 1954.

Manufacture of milled textile fabrics

H. Hassan. BP 705 055, March 10, 1954.

Manufacture of woven multi-ply narrow fabrics

E. Thorp (to Thomas French & Sons Ltd.). BP 705 481, March 17, 1954.

Method and apparatus for the production of filaments and nonwoven fabrics

F. W. Manning. USP 2 687 363, August 24, 1954.

Method and means for the manufacture of fabrics consisting of adhesively-bound threads

G. E. Chadwick, G. E. Collins and W. J. Roff (to British Cotton Industry Research Assoc.). BP 703 614, February 10, 1954.

Method of forming silica textile materials

L. Parker (to the H. I. Thompson Co.). USP 2 686 954, August 24, 1954.

Nylon crepe fabric and yarn
A. L. Dorgin. BP 705 274, March 10, 1954.

Process and apparatus for forming a reinforced edge on fusible fabric
N. Rolaston and C. C. Middleton (to British Industrial Plastics Ltd.). BP 705 252, March 10, 1954.

Stretchable floor covering
M. C. Teague (to United States Rubber Co.). USP 2 688 578, September 7, 1954.

Means for discharging static electricity
K. Fearnside (to Isotope Developments Ltd.). BP 705 255, March 10, 1954.

Method of stripping textile fibers from spools
A. J. Pike (to Neponset Woolen Mills). USP 2 686 953, August 24, 1954.

Web edge position detector
R. J. Kroth (to Askania Regulator Co.). USP 2 687 885, August 31, 1954.

Cloth guide
W. M. Phelps (to Chatsworth Mfg. Co.). USP 2 685 725, August 10, 1954.

Apparatus for controlling the winding and unwinding of flexible material
W. Bradley. BP 706 006, March 24, 1954.

Fabric winding machine
J. H. White. BP 706 135, March 24, 1954.

Winding tension apparatus
M. G. Jones (to American Viscose Corp.). USP 2 688 111, August 31, 1954.

FINISHES D

WET PROCESSES D 1

Coated threads
R. J. B. Marsden and W. I. R. Martin (to North British Rayon Ltd.). BP 702 828-9, January 27, 1954.

Electrostatic production of pile fabrics
K. G. Burridge and H. A. Hirst (to Dunlop Tire and Rubber Corp.). USP 2 686 733, August 17, 1954.

Manufacture of carpets and rugs
G. May (to V. G. (London) Ltd.). BP 706 399, March 31, 1954.

Method of incorporating resinous materials with negatively charged cellulosic fibers in aqueous suspension
H. H. Latham and J. R. Morton (to Morton Chemical Co.). USP 2 686 121, August 10, 1954.

Suspensions of polymeric flame-proofing compositions containing phosphate and halomethyl groups
J. G. Frick, Jr. and J. W. Weaver (to United States of America). USP 2 686 768, August 17, 1954.

Water-repellent compositions
British Thomson-Houston Co. Ltd. BP 705 277, March 10, 1954.

Wet processing of textile fabrics
R. Hayes and W. J. Goldberg (to Celanese Corp.). USP 2 686 347, August 17, 1954.

DYEING AND PRINTING D 2

Coloration of cellulose acetate by vat dyestuffs
A. R. Urquhart, G. R. Sutcliffe and P. Coburn (to Lansil Ltd.). BP 705 332, March 10, 1954.

Vat dyeing of cellulose acetate
H. C. Olpin and T. Jackson (to British Celanese Ltd.). USP 2 686 707, August 17, 1954.

DRY PROCESSES D 3

Machine for corrugating fibrous webs
E. R. Frederick (to United States of America). USP 2 685 910, August 10, 1954.

Mounting for calender rolls
C. V. Hinton (to the Terrell Machine Co.). USP 2 685 711, August 10, 1954.

TESTING AND MEASUREMENT E

FABRICS E 3

Textile abrasion testing machine
E. E. Stout (to Louisiana State University). USP 2 687 641, August 31, 1954.

GENERAL E 4

Measuring device or the like for textile materials
R. M. Brink and K. J. Chichester (to Deering Milliken Research Trust). USP 2 685 960, August 10, 1954.

BOOKS, PAPERS, AND PAMPHLETS

Added to the library during the past month

CHEMISTRY

	Elsevier's Encyclopaedia of organic chemistry, v. 12B. Ser. III, p. 4561-4840.	Amsterdam, Elsevier, 1954.
Ott, E.	Cellulose and cellulose derivatives. 2nd ed. pt. 1. (High polymer series, v. 5).	N. Y., Interscience, 1954. 509 p.

COTTON

	Cotton year book (incorporating the Rayon and Synthetic Fibres Annual). 49th ed.	London, Textile Mercury Ltd., 1954. 838 p.
Rouse, J. T.	Micronaire testing of cotton samples in prevailing atmospheric conditions.	Wash., U. S. Agri. Mktg. Service, 1954. 8 p.
U. S. Agri. Mktg. Service.	Cotton varieties planted, 1950-1954.	Memphis, Tenn., August, 1954. 27 p.
U. S. Agri. Research Service.	Progress report on the annual varietal and environmental study of fiber and spinning properties of cottons, 1953 crop.	Beltsville, Md., June, 1954. 105 p.
Wilmeth, J. B.	Breaking out bales of cotton stored on head. (Marketing research report no. 61)	Wash., U. S. Agri. Mktg. Service, 1954. 23 p.

KNITTING

Eley, A. W.	Stockings: silk, cotton, rayon, nylon.	Leicester, Eng., Hosiery Trade Journal Ltd., 1953. 226 p.

STATISTICS

Bennett, C. A.	Statistical analysis in chemistry and the chemical industry.	N. Y., Wiley, 1954. 724 p.
Marchant Calculators, Inc.	Marchant statistical quality control.	Oakland, Calif., 1954. 51 p.
U. S. Nat. Bureau of Standards.	Monte Carlo method.	Wash., 1951. 42 p.
U. S. Nat. Bureau of Standards.	Tables to facilitate sequential t-tests.	Wash., 1951. 82 p.

SYNTHETIC FIBERS

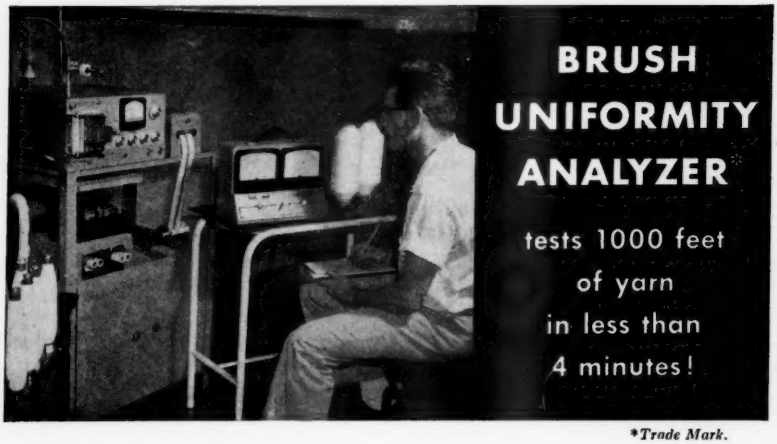
	British rayon and synthetic fibres manual. 2d ed. rev.	Manchester, Eng., Harlequin Press, 1954. 364 p.
Wormell, R. L.	New fibres from proteins.	N. Y., Academic Press, 1954. 208 p.

TEXTILE DIRECTORIES

	Davison's textile directory for executives and salesmen, 1954.	Ridgewood, N. J., Davison, 1954. 455 p.
	Skinner's hosiery and knit goods directory, 1954.	Manchester, Eng., Thomas Skinner, 1954. 350 p.

WOOL

Alexander, P.	Wool: its chemistry and physics.	London, Chapman and Hall, 1954. 404 p.
Radcliffe, J. W.	Woollen and worsted yarn manufacture.	Manchester, Eng., Emmott, 1953. 423 p.
Williams, D. R. H.	Machinery management and control in a wool textile factory.	Manchester, Eng., Emmott, 1952. 257 p.



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